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(12) **United States Patent**  
**French et al.**(10) **Patent No.:** **US 6,430,997 B1**  
(45) **Date of Patent:** **\*Aug. 13, 2002**(54) **SYSTEM AND METHOD FOR TRACKING  
AND ASSESSING MOVEMENT SKILLS IN  
MULTIDIMENSIONAL SPACE**(75) Inventors: **Barry J. French**, Bay Village; **Kevin  
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OH (US)(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.This patent is subject to a terminal dis-  
claimer.(21) Appl. No.: **09/654,848**(22) Filed: **Sep. 5, 2000****Related U.S. Application Data**

- (63) Continuation of application No. PCT/US99/04727, filed on Mar. 3, 1999, which is a continuation-in-part of application No. 09/173,274, filed on Oct. 15, 1998, which is a continuation-in-part of application No. 09/034,059, filed on Mar. 3, 1998, now Pat. No. 6,073,489, which is a continuation-in-part of application No. PCT/US96/17580, filed on Nov. 5, 1996, which is a continuation-in-part of application No. 08/554,564, filed on Nov. 6, 1995, now Pat. No. 6,098,458.
- (60) Provisional application No. 60/121,935, filed on Feb. 26, 1999.

(51) **Int. Cl.<sup>7</sup>** ..... **A61B 5/22**(52) **U.S. Cl.** ..... **73/379.04**(58) **Field of Search** ..... 73/379.01, 379.04;  
482/4, 8(56) **References Cited****U.S. PATENT DOCUMENTS**

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Sklar, LLP(57) **ABSTRACT**

Accurate simulation of sport to quantify and train performance constructs by employing sensing electronics for determining, in essentially real time, the player's three dimensional positional changes in three or more degrees of freedom (three dimensions); and computer controlled sport specific cuing that evokes or prompts sport specific responses from the player that are measured to provide meaningful indicia of performance. The sport specific cuing is characterized as a virtual opponent that is responsive to, and interactive with, the player in real time. The virtual opponent continually delivers and/or responds to stimuli to create realistic movement challenges for the player.

**30 Claims, 28 Drawing Sheets**